Electricity:

- Charge:

Particle	mass	charge
proton	$\sim 10^{-27}$ kg	+1
neutron	$\sim 10^{-27}$ kg	Ø
electron	$\sim 10^{-31}$ kg	−1

- Electrons are relatively easily moved, so charge may be built up on a surface.

- Most of the time, the net charge on an object is Ø. This means that there are equal #'s of protons and electrons.

- Net positive → more + than −
  Net negative → more − than +

- Conductor → substance that allows electrons to move easily.

  Best example are metals.

- Insulator → does NOT allow easy electron flow

  Non-metallic solids are the best example.

- If a material is solid but non-conductive, charge can be placed on the object.

  The charge will not move, and the object will be net negative.

- charge of a proton/electron (magnitude of)

  $1.6 E-19$ C

  ↳ Coulomb

- letter for charge is q.

- Coulomb's law: absolute value of charge

$$F = \frac{k\,|q_1|\,|q_2|}{r^2}$$

↳ distance between charges

↳ Coulomb's constant $8.99 E9$ $N \cdot m^2/C^2$

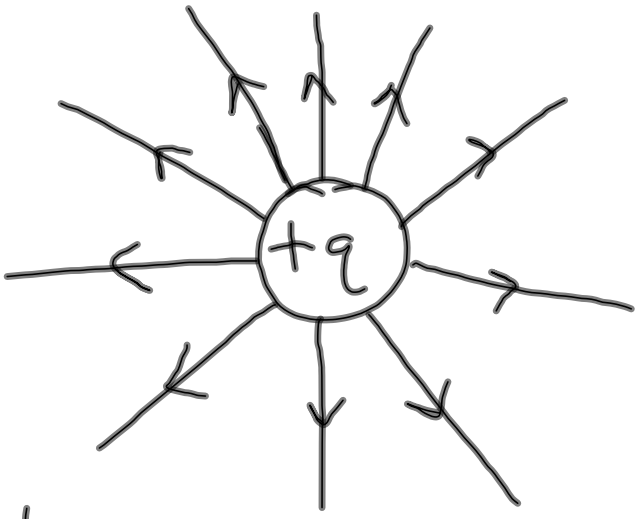
↳ electric force

- Plugging in numbers above gives the magnitude of the force vector.

Direction comes from +/− of charge.

- Like charges repel; unlike charges attract.

- Electric field:
  - This exists around every charged particle.



- electric field lines → show direction of electric field.
- Arrow point away for + charges; towards for − charges.
- calculate electric field:

$$\overline{E} = \frac{\overline{F}}{q}$$

$\overline{F}$ → electric force

q → charge

↳ electric field